

Information Systems Office

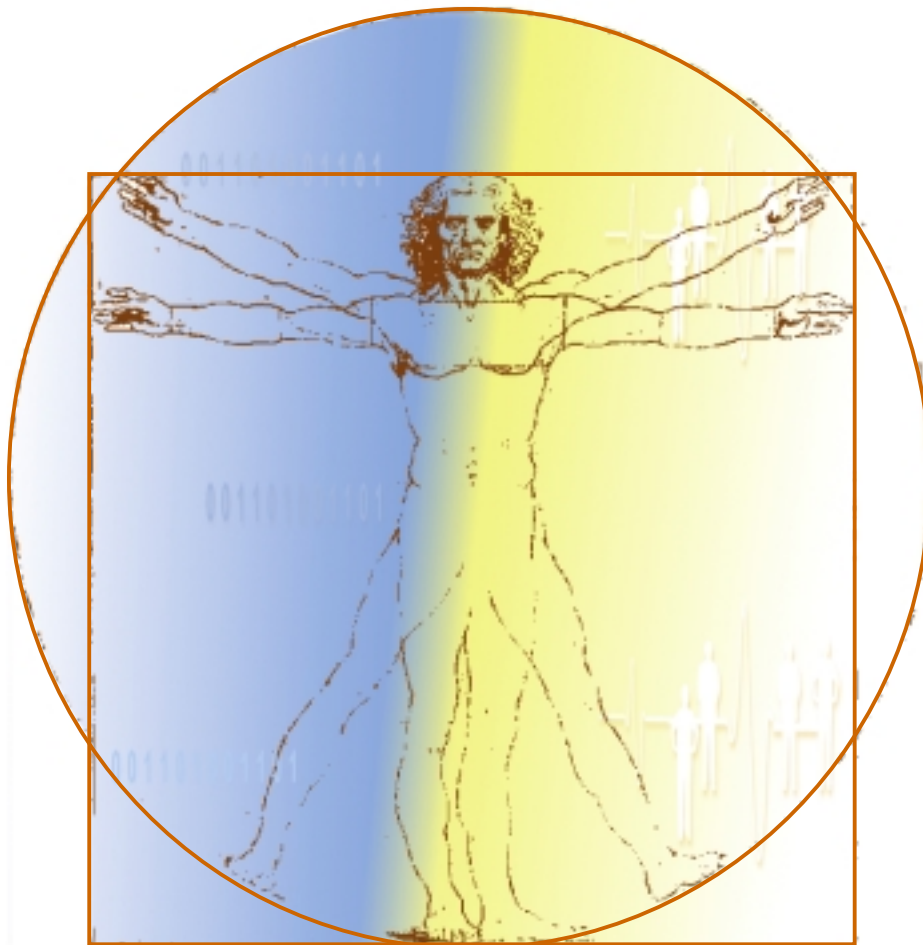


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Information Systems Prosthetic



Challenge:
Overcome
Human
Limitations

- Speed
- Complexity

Autonomic
←

Human
→

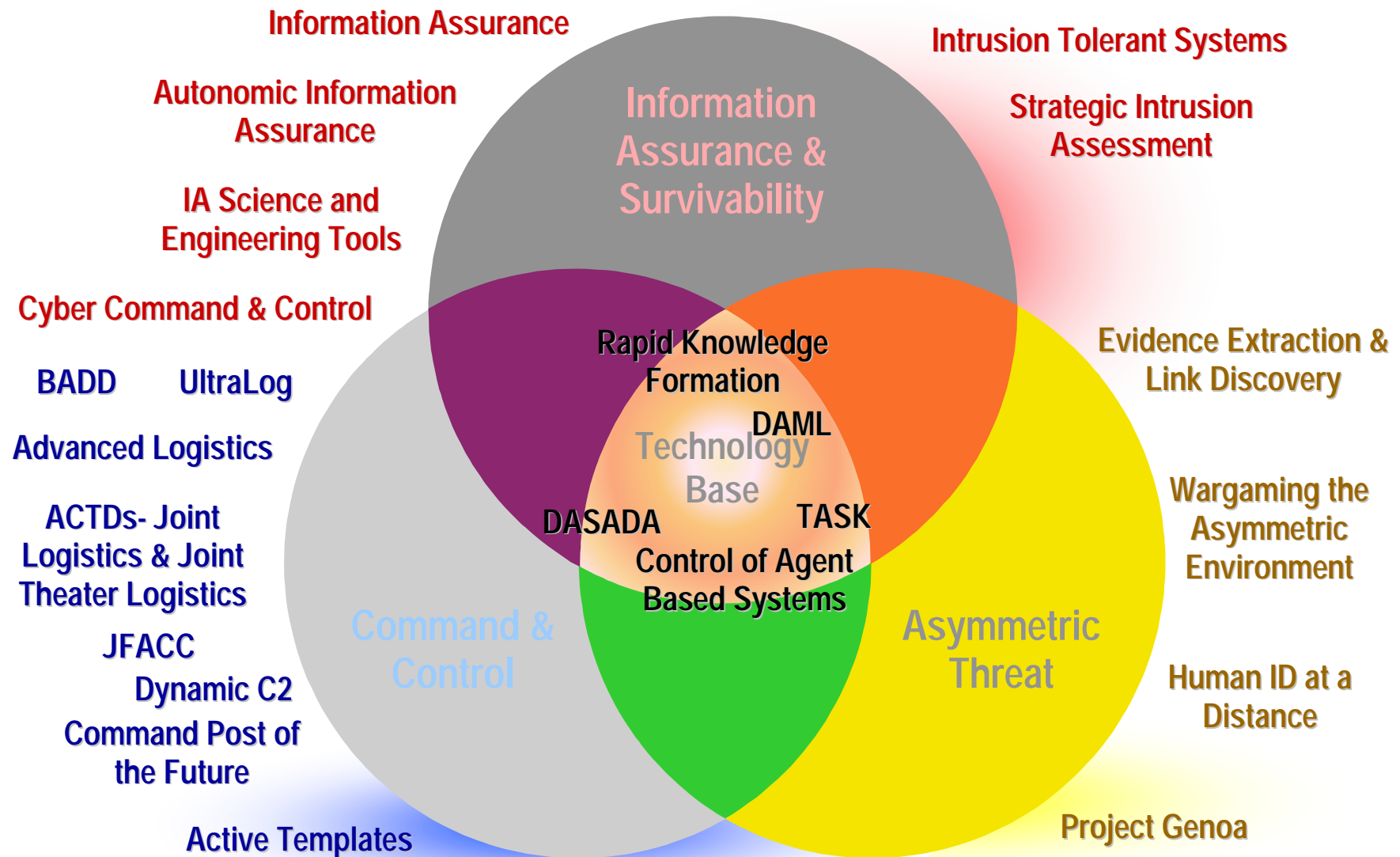


ISO Program Areas



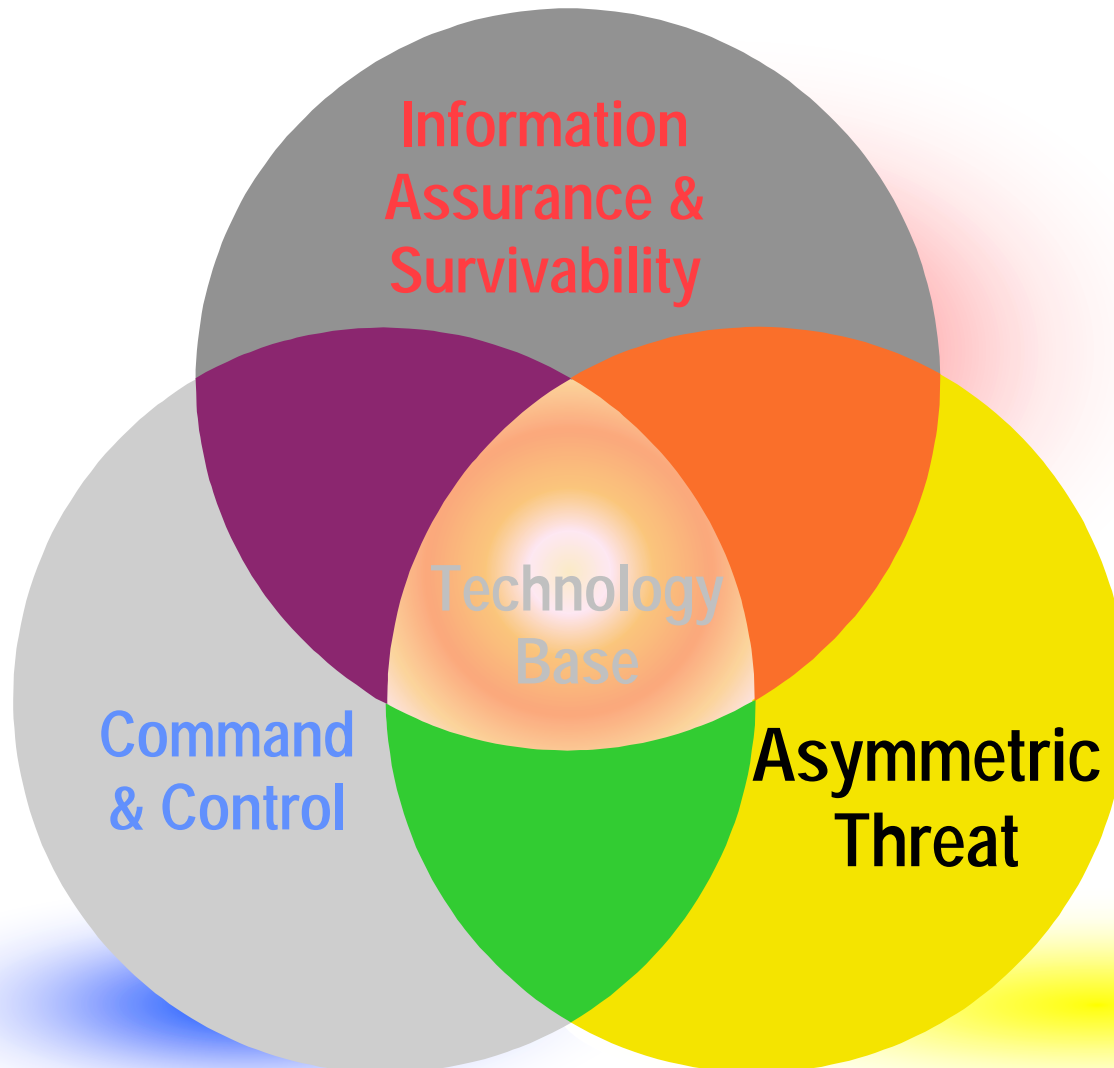


ISO Program Areas





ISO Program Areas



Unconventional yet highly lethal attack by a loosely organized group of transnational terrorists



The Nuclear Threat

A Historical Perspective

...I conceded that **more intelligence** about their war-making capabilities **was a necessity.**"

- President Dwight D. Eisenhower

Post - Attack Preparation

"Need to Know Sooner"

1950

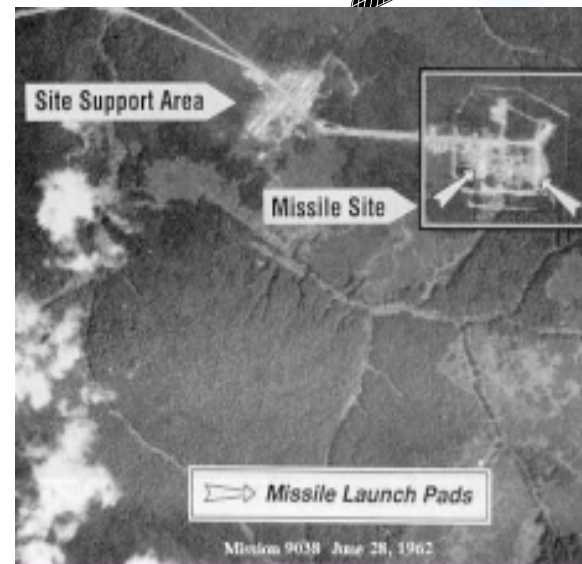
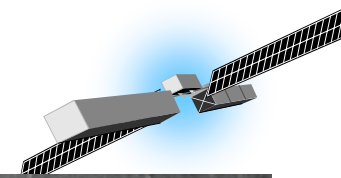
"Mommy, what happens to us
if the bomb drops?"



1955



1960



Yurya ICBM Complex of a SS-7 Launch Site (Mission 9038, June 28, 1962)





The Asymmetric Threat

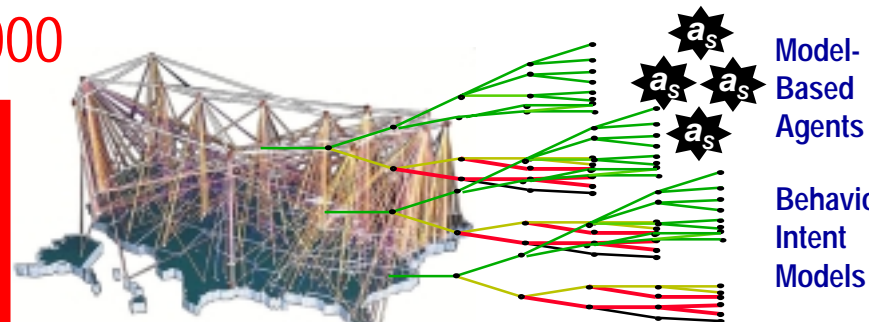
Today's Perspective

Post - Attack Preparation

Preemptive: "Need to Know Sooner"



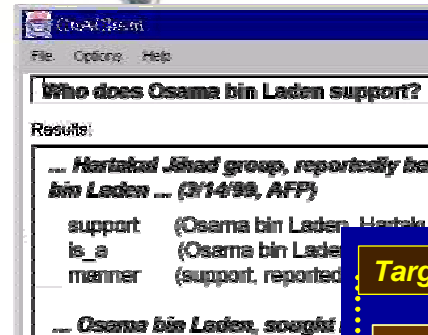
2000



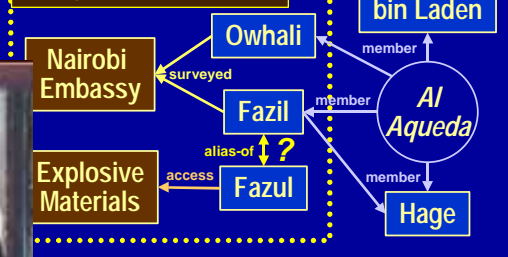
Model-Based Agents

Behavior & Intent Models

Open Source Evidence Extraction & Link Discovery



Target Selection ?

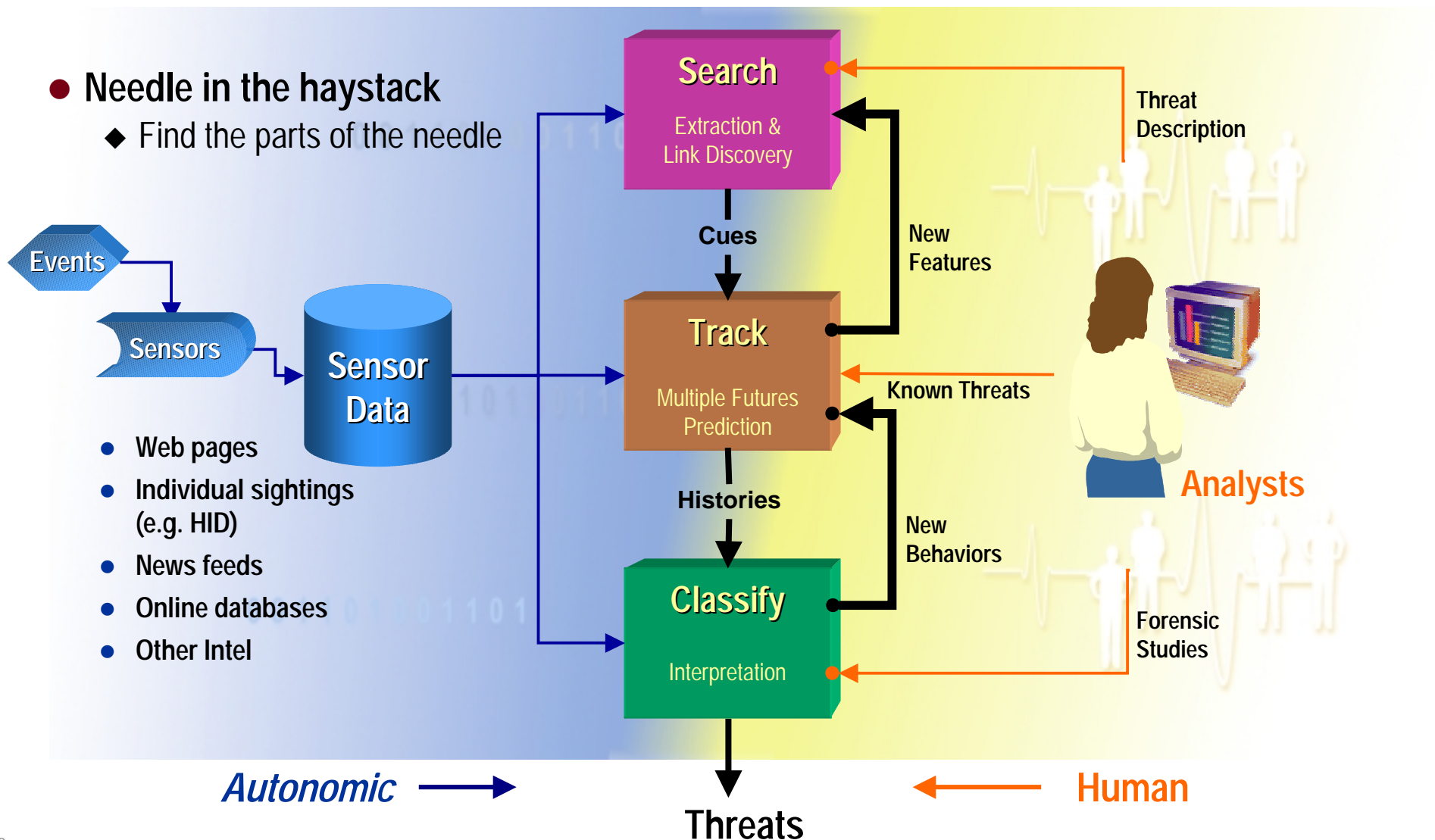


Human Identification



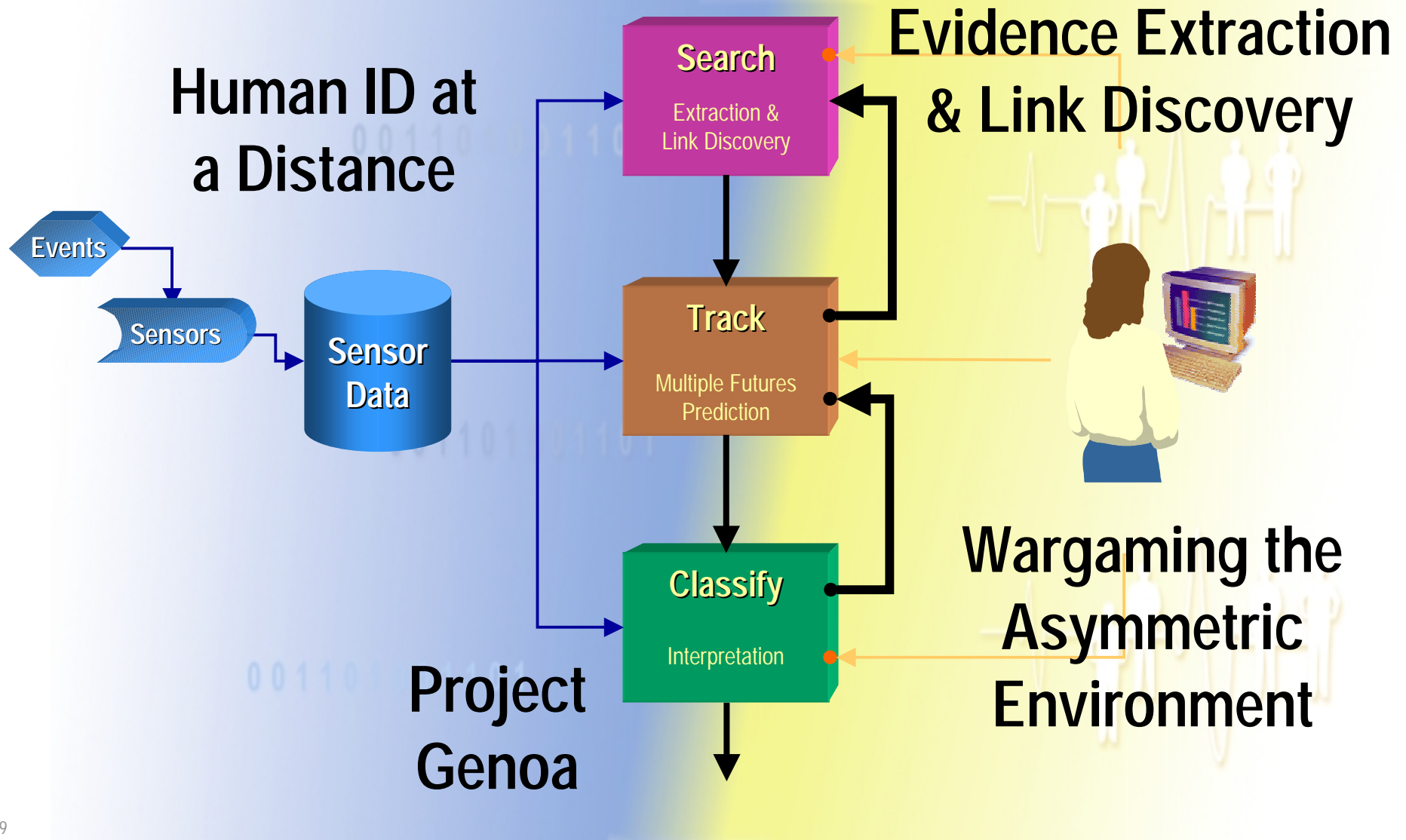
Asymmetric Threat

A Surveillance Problem





Asymmetric Threat Programs





ISO Program Areas



Mitigate national and defense computing infrastructure vulnerabilities that could be exploited by information warfare enemies



IA&S Community

Policy

National Security Telecommunications and Information Systems Security Committee



President's Commission on Critical Infrastructure Protection

Computer System Security and Privacy Advisory Board



Office of Information Security



Information Assurance Outreach Program

Forensics & Ops



Services Infosec

FEDERAL BUREAU OF INVESTIGATION
NATIONAL COMPUTER CRIME SQUAD

Defense Security Service



Research





Information Assurance & Survivability *Problem Space*

The Problem:

- Our current DOD information security strategy is failing to keep pace with the current threats.
- We anticipate that future threats will be more sophisticated and widespread.



IA&S Responses

- **Change the “business model”**
 - ◆ Operationally focused, system oriented
 - ◆ Transfer technology directly to DoD systems
 - ◆ Let commercial systems catch up to military-level security
- **A broadening of our view of “solution space”**
 - ◆ Host-based/software approach
 - ◆ Include communications and computer architectural engineering
- **A broadening of operational focus**
 - ◆ Wireless, mobile
 - ◆ Operational challenge problems

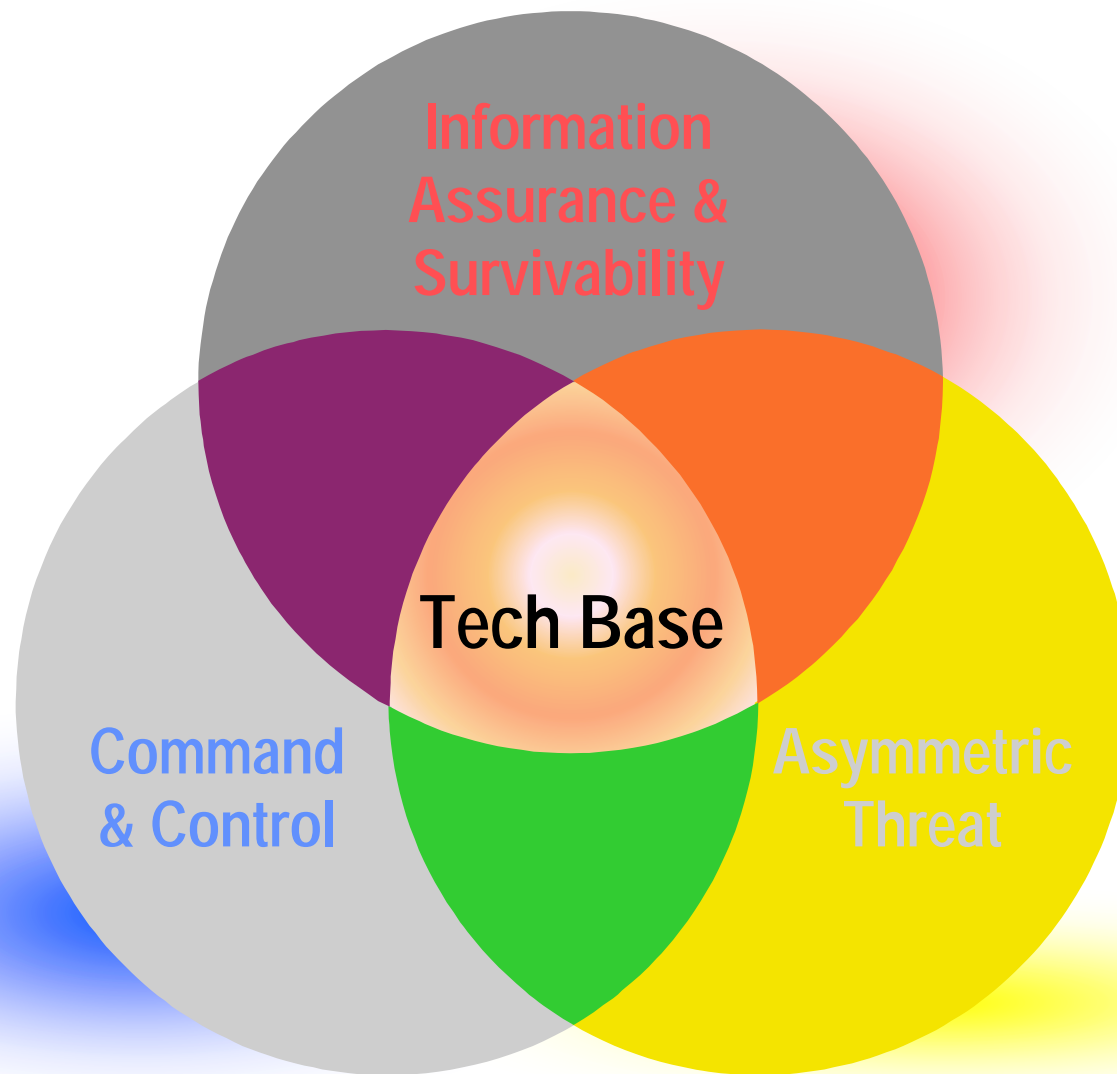


FY01 IA&S Themes

- DoD System Focus
- Operational Experimentation
- Security in Mobile, Wireless Domain
- Impact Upon Command and Control
- Next-Generation Secure Systems

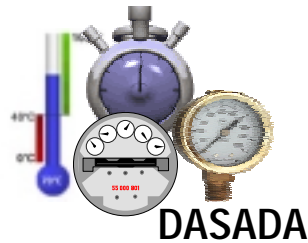
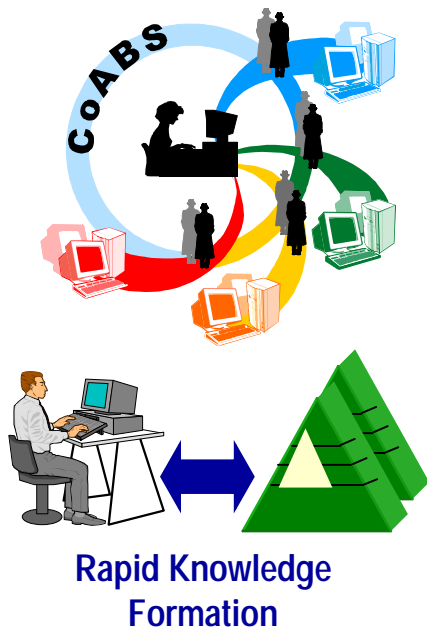


ISO Program Areas





Tech Base: *Supporting ISO, Commercial & DoD Systems*



- Agents
- Run time integration of heterogeneous systems
- Reinforcement learning
- Hybrid nonlinear dynamic control
- Mobile agents
- Neural nets
- Scalability
- Interoperability
- Agent clusters and interactions
- Knowledge bases
- System science
- Dynamic assembly of software



Knowledge-Based Information Retrieval

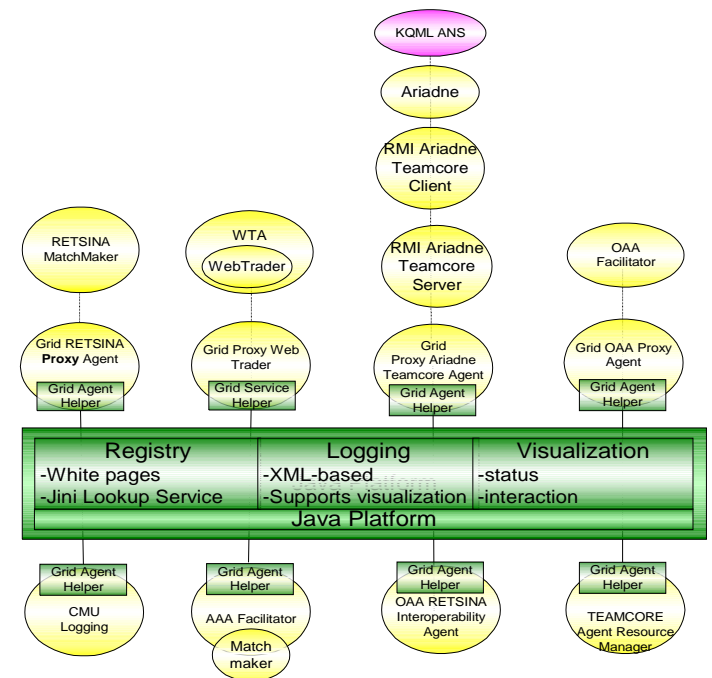
Which country has the greater gross domestic product: Saudi Arabia or Iran?



Altavista: 1M responses,
first 10 (at least) irrelevant

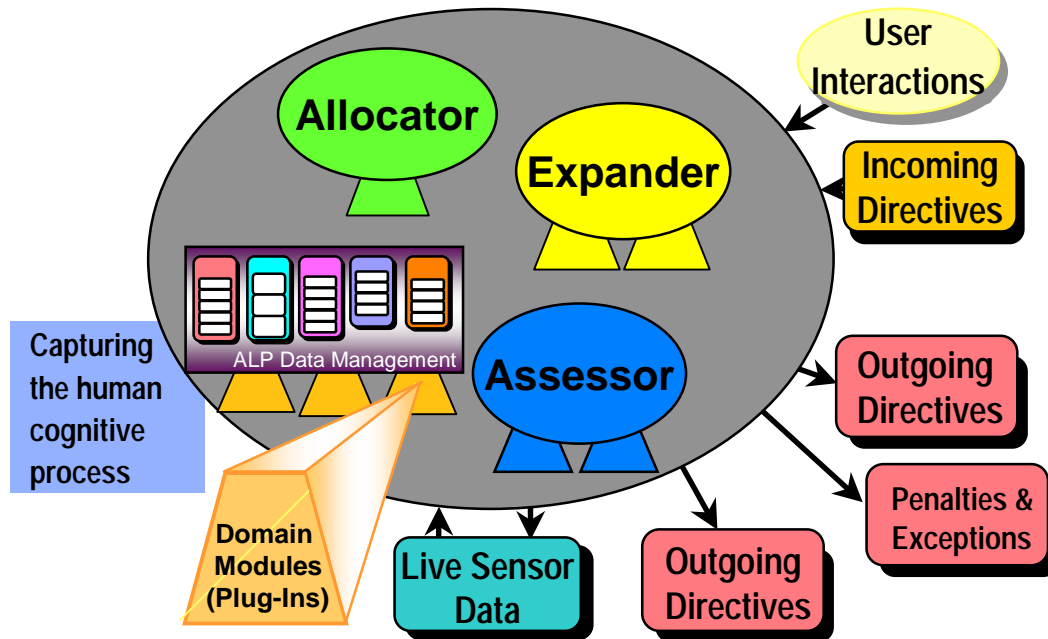


START (An HPKB Technology):
Retrieved just the right information



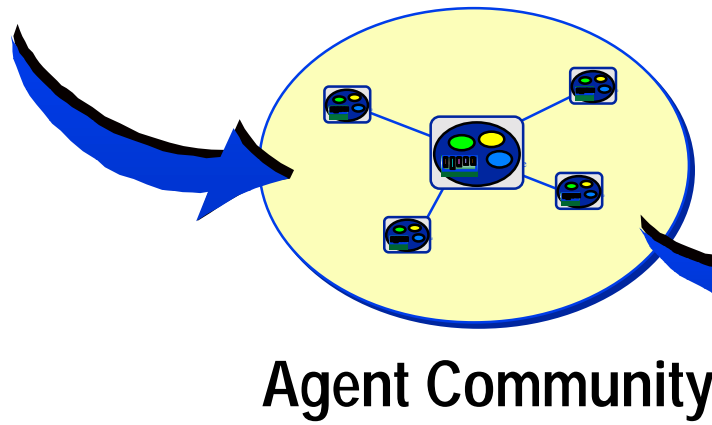
- **Facilitates interoperability of diverse systems**
 - ◆ Enables dynamic connection of disparate information sources and C2 applications
 - ◆ Enables software systems to cooperatively solve user tasks
- **Grid Agent Helper and the Grid Service Helper facilitate CoABS component access to Grid services and to other registered Grid components**

Cognitive Agent Architecture

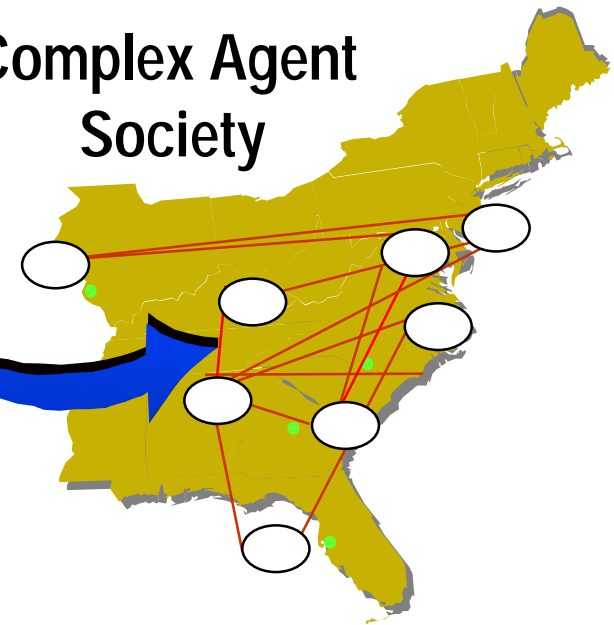


**First Large-Scale
Distributed Agent-
Based Architecture**

**Basic Building
Block
Agent "Cluster"**

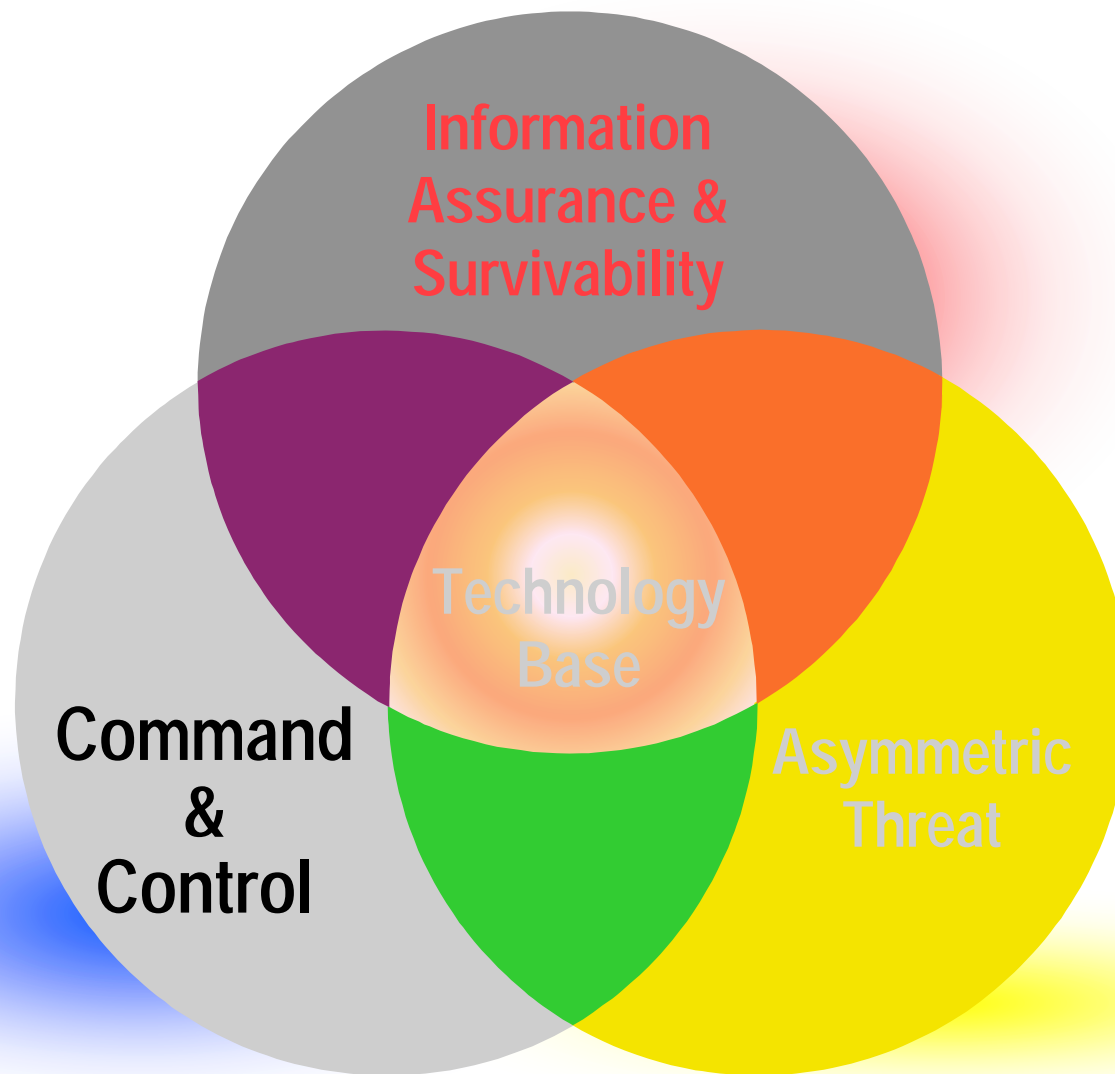


**Complex Agent
Society**





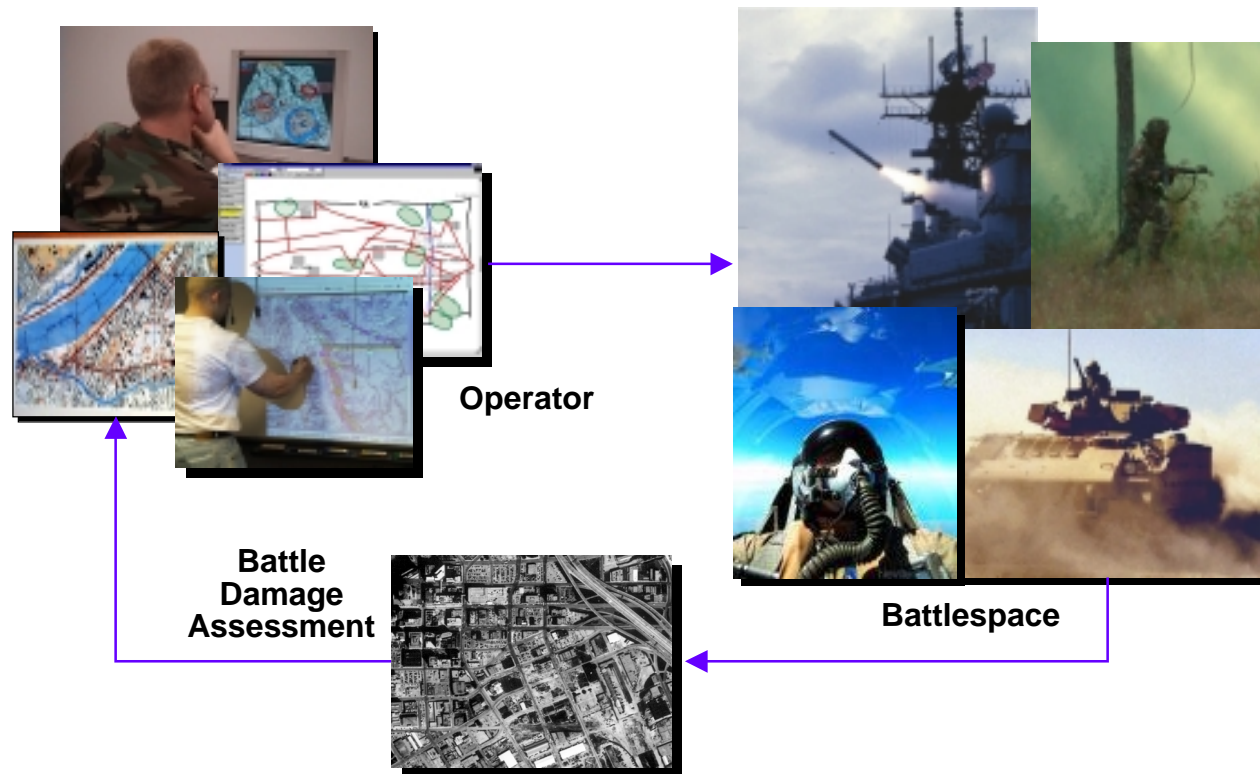
ISO Program Areas



Current Command & Control Limitations

Limitations Today

- Operator reaction limited
- Feedback loop is not coordinated
- Unsynchronized
 - ◆ Things start to break
- OODA loop broken e.g., Kosovo

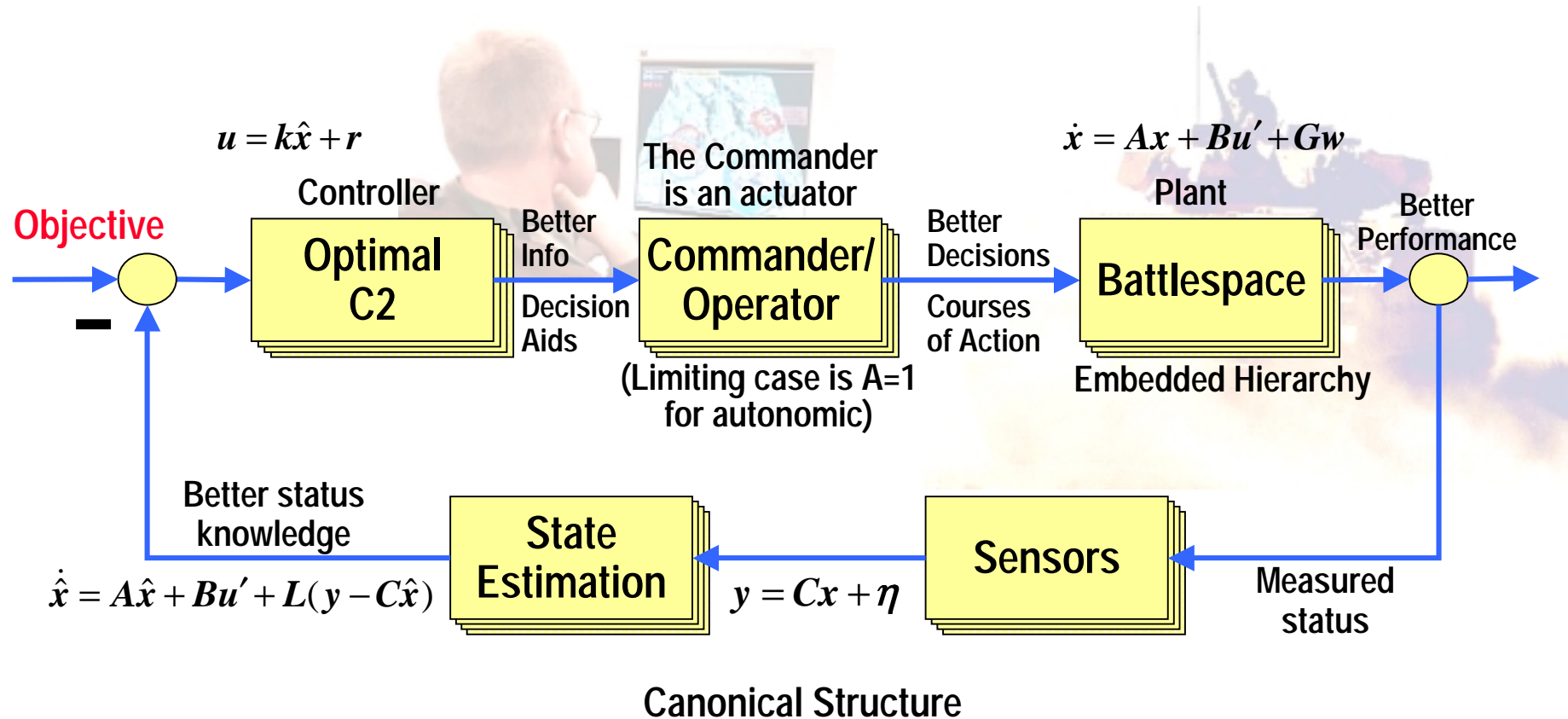


The Future

- Autonomic systems
- Higher op tempo
- Synchronized ops
- Human becomes more of a limitation

Dynamic Control Concept

Man & Machines



Synchronization of manned & autonomic forces in space, time, and purpose can be achieved through the application and extension of control theory



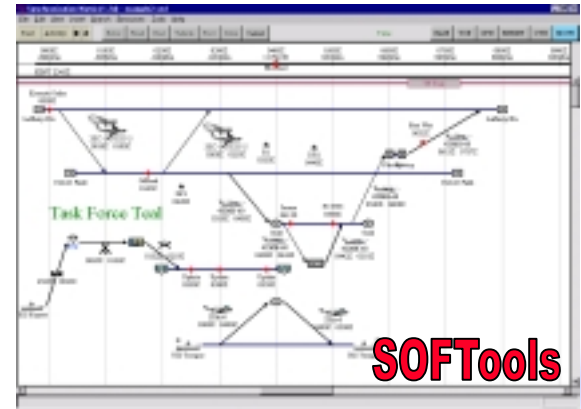
Command & Control Programs



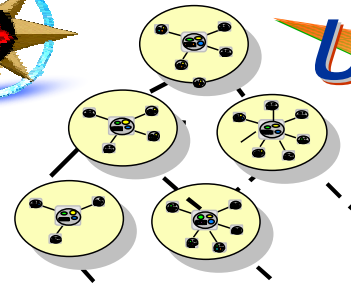
CPOF

Command
Post of the
Future

Active
Templates

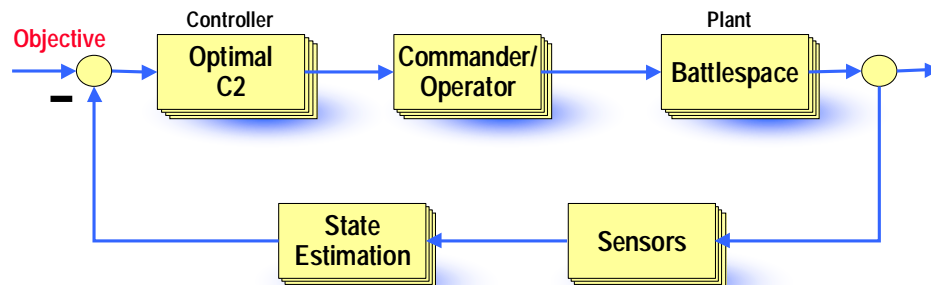


Advanced
Logistics
Project



ULTRA*LOG

Ultra Log



Man & Machine
Command & Control



Joint Logistics
& Joint Theater
Logistics ACTDs



Information Systems Office

Today's Speakers

